**INVASIVE SPECIES CONTROL PROJECTS (R1 SMALL GRANTS)**
**CY 2015 FINAL REPORT**

Project Title: Control of English Holly

Station: Hakalau Forest National Wildlife Refuge

Contact Person: Steve Kendall, Wildlife Biologist

Project Description: Hakalau Forest NWR (Hakalau) was established to conserve endangered forest birds and their habitats. Since establishment of the refuge there has been significant progress in forest restoration leading to increasing populations of native forest birds. However, these gains are threatened by invasion of exotic plants, animals and disease. English holly (*Ilex aquafolia*) was identified as a highest priority target invasive plant species in Hakalau Forest NWR's 2010 Comprehensive Conservation Plan (CCP). It is a tall shrub or small tree that can spread via seeds or vegetatively and can out-compete native species. Holly was originally planted around ranch buildings located in this area prior to establishment of the refuge. Currently it is mostly confined to the southwest portions of the refuge, but is spreading to other areas. English holly produces berry which are eaten by native and non-native birds, leading to dispersal of seeds into previously non-invaded areas. Hakalau Forest NWR is one of few places where English holly is found in Hawaii, so eradication here is crucial not only for the refuge, but for other native ecosystems in the state.

Invasive Species Targeted: English holly (*Ilex aquafolia*)

Project Completion Date or Estimated Completion Date: 10/31/2016

Project Results: We added FY15 funds from the Invasive Species Small grant to a new contract for Florida blackberry and English holly control, which is also supported with U.S. Forest Service Forest Health funds. The new contractor (Forest Solutions) began weed control work the week of December 14, 2015. FY14 funds were used by the previous weed control contractor (Pono Pacific) to conduct English Holly control in calendar year 2015. In 2015, the contractor split control efforts between English holly and blackberry. Most of the holly control this year focused in the area of highest concentration in the Pua Akala management unit of the refuge (see map). In 2014, holly control methods were modified requiring 100% removal of all plants, i.e. no foliar herbicide treatment. Younger seedlings were pulled out. Larger plants, tree form or too large to pull out by roots, were cut and stumps were treated with Element 4 and crop oil. If possible roots are dug up and treated as well. This intensive treatment increases the amount of labor required, but is expected to significantly increase the effectiveness of eradication efforts. Work is ongoing, but the current contract ends October 31, 2016. Thus far, approximately 300 acres have been treated.

Currently, we are probably somewhere around 50% control. We have had the following issues that have slowed our progress:

- Control methods previous used were not 100% effective, resulting in regrowth (and at much higher densities than originally occurring).

- New effective control methods are more intensive and require more labor/time.
- Not having a complete picture on how big the problem was (the contractor was a bit more optimistic than realistic).
- Bird dispersal of seeds, leading to many areas of small plants growing away from concentration areas that we are working on.
- Regrowth from seeds and root sprouts in concentration areas previously treated.

We still believe this is the one plant we have the best chance of controlling at Hakalau. Unfortunately, the time frame and effort will be considerably greater than originally anticipated.

Number of Acres Treated: 300

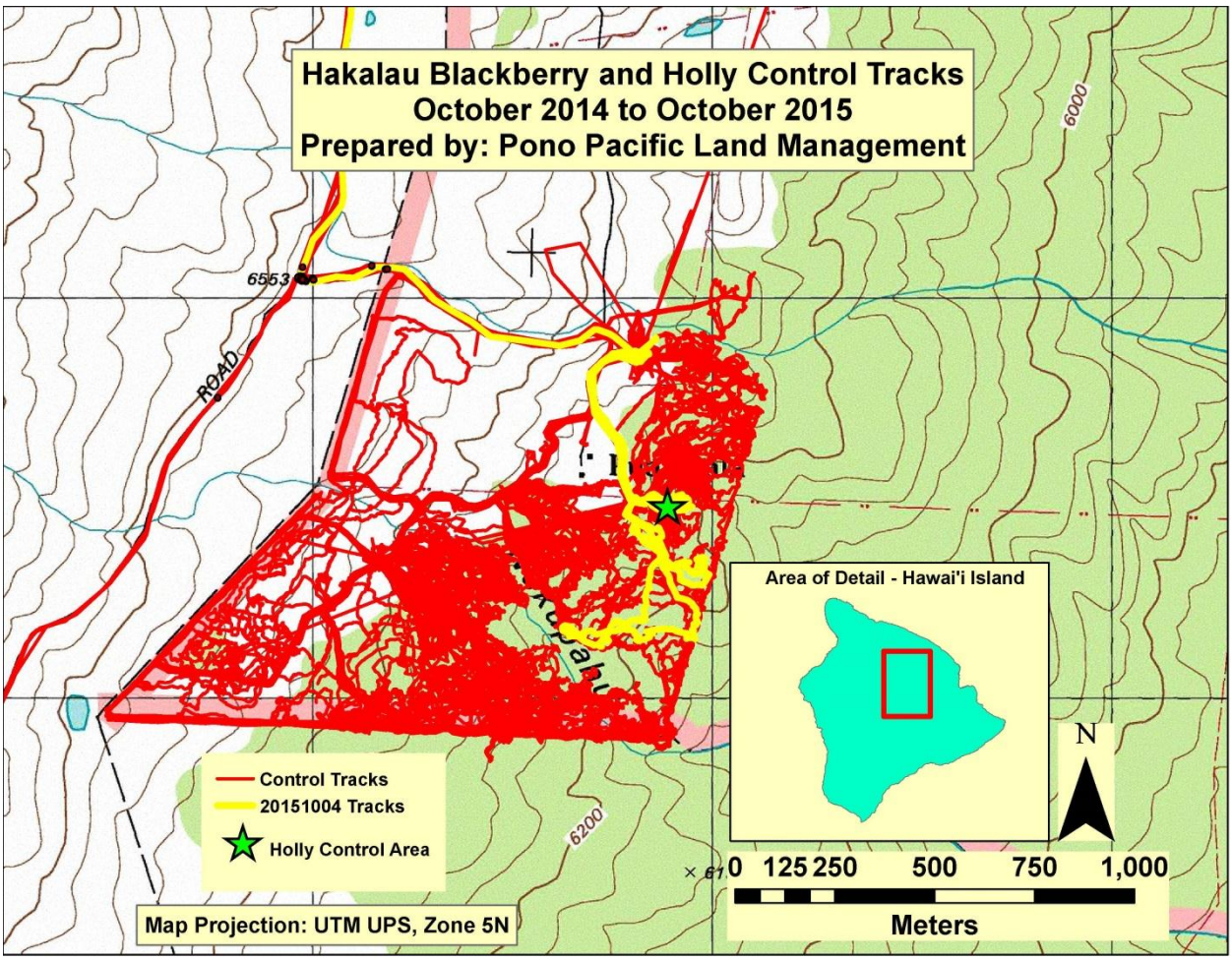
Number of Acres Inventoried and/or Mapped: N/A

Number of Acres Restored: N/A

Total Grant Amount: $37,000

Breakdown of Expenditures:

| **Category** | **Total $ Spent** | **% of Total Grant** |
|---|---|---|
| Equipment/Supplies | | |
| Chemical | | |
| Biocontrol Agents | | |
| Travel | | |
| Biotech/Contractor Salary | $37,000 | 100 |
| Restoration Materials | | |
| Other (Describe) | | |
| **TOTAL** | | |


Hakalau Blackberry and Holly Control Tracks
October 2014 to October 2015
Prepared by: Pono Pacific Land Management
6553
ROAD
6000
6200
Control Tracks
20151004 Tracks
Holly Control Area
Map Projection: UTM UPS, Zone 5N
Area of Detail - Hawai'i Island
N
0 125 250 500 750 1,000
Meters